

ABSTRACT

A Comparison Between Linear Regression and Neural Network Models to Predict Tea Yield Production

By

Faris Satya Wibisana

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Tea yield prediction is a technique to predict tea production, essential to support macro-level and micro-level decision-making processes in a country. With the integration of machine learning algorithms to tea yield prediction, it is expected that a more accurate prediction can be achieved and benefit all parties. Many machine learning models may be utilized to create a crop yield prediction model, with different complexity for each model. The models that are selected for this research are Linear Regression which represents the classical statistical model, Multi-Layer Perceptron, which represents a simple artificial neural network model, and Long Short-Term Memory, which represents a more complex neural network. The result shows that Multi-Layer Perceptron has the best performance compared to the other, followed by Linear Regression. Multi-Layer Perceptron outperforms Linear Regression by ~18% and ~40% compared to Long Short-Term Memory in Mean Squared Error. However, the Linear Regression model is still the fastest compared to the other two. Long Short-Term Memory, even though it underperformed compared to the other two, is the most stable when talking about the sudden spikes in the data. This emphasizes the potential that neural networks have in crop yield prediction, which, if tuned correctly, will outperform the classical statistical model.

Keywords: Long Short Term Memory, Multi-Layer Perceptron, Linear Regression, Time Series, Tea Yield Prediction